

HATCHERY AND GENETIC MANAGEMENT PLAN (HGMP)

Hatchery Program:	Minter Creek Fall Chinook Fingerling Program
Species or Hatchery Stock:	Fall Chinook (<i>Onchorhynchus tshawytscha</i>) Minter Creek
Agency/Operator:	Washington Department of Fish and Wildlife
Watershed and Region:	Minter Creek, Puget Sound
Date Submitted:	, 2002
Date Last Updated:	August 21, 2002

SECTION 1. GENERAL PROGRAM DESCRIPTION

1.1) Name of hatchery or program.

Minter Creek Fall Chinook - Fingerling Program

1.2) Species and population (or stock) under propagation, and ESA status.

Minter Creek Fall Chinook

1.3) Responsible organization and individuals

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Other agencies, Tribes, co-operators, or organizations involved, including contractors, and extent of involvement in the program:

In addition to WDFW's Minter Creek Hatchery production, fish are transferred to NMFS Manchester for research and to a volunteer cooperative project for rearing and release. Eyed eggs are given to the South Puget Sound Regional Enhancement Group, two volunteer cooperative projects and local schools for rearing and release.

Minter Creek also supports, by way of Coulter Creek facility, the early rearing of the fingerling production of Deschutes River chinook for the Tumwater Falls chinook program.

1.4) Funding source, staffing level, and annual hatchery program operational costs.

This program is funded through the State General Fund.

1.5) Location(s) of hatchery and associated facilities.

The Minter Creek Hatchery is located on Minter Creek (15.0048) at RM 0.5. Minter Creek is a tributary to Carr Inlet on Puget Sound, Washington.

Coulter Creek Hatchery is located at RM 0.25 on Coulter Creek (15.0002), tributary to

Case Inlet on Puget Sound, Washington.

1.6) Type of program.

Isolated Harvest

1.7) Purpose (Goal) of program.

Augmentation.

The goal of this program is to provide adult fish for harvest opportunity.

1.8) Justification for the program.

The program's goal is to provide fish for harvest. We will minimize interaction with wild stocks in Minter Creek by releasing fish as smolts as programmed in the Future Brood Document.

1.9) List of program “Performance Standards”.

1.10) List of program “Performance Indicators”.

Performance Standards and Indicators for Puget Sound **Isolated Harvest** Chinook programs.

Performance Standard	Performance Indicator	Monitoring and Evaluation Plan
Produce adult fish for harvest	Survival and contribution rates	Monitor catch and cwt data
Meet hatchery production goals	Number of juvenile fish released - 1,800,000	Future Brood Document (FBD) and hatchery records
Manage for adequate escapement where applicable	Hatchery return rates	Hatchery return records

Minimize interactions with listed fish through proper broodstock management and mass marking. Maximize hatchery adult capture effectiveness. Use only hatchery fish	Number of broodstock collected - 1,400 adults (see section 1.11.1)	Rack counts and CWT data
	Stray Rates	Spawning guidelines
	Sex ratios	Hatchery records
	Age structure	
	Timing of adult collection/spawning - late August thru October	Spawning guidelines Hatchery records
	Adherence to spawning guidelines - 1:1 with 5 fish pools	
	Total number of wild adults passed upstream - none	
Minimize interactions with listed fish through proper rearing and release strategies	Juveniles released as smolts	FBD and hatchery records
	Out-migration timing of listed fish / hatchery fish N.A. / May	FBD and historic natural outmigration times FBD and hatchery records
	Size and time of release 80 fpp/ May release	CWT data, mark/unmark ratios
Maintain stock integrity and genetic diversity	Effective population size	Spawning guidelines
	Hatchery-Origin Recruit spawners	

<p>Maximize in-hatchery survival of broodstock and their progeny; and</p> <p>Limit the impact of pathogens associated with hatchery stocks, on listed fish</p>	<p>Fish pathologists will monitor the health of hatchery stocks on a monthly basis and recommend preventative actions / strategies to maintain fish health</p>	<p>Co-Managers Disease Policy</p> <p>Fish Health Monitoring Records</p>
	<p>Fish pathologists will diagnose fish health problems and minimize their impact</p>	
	<p>Vaccines will be administered when appropriate to protect fish health</p>	
	<p>A fish health database will be maintained to identify trends in fish health and disease and implement fish health management plans based on findings</p>	
	<p>Fish health staff will present workshops on fish health issues to provide continuing education to hatchery staff.</p>	
<p>Ensure hatchery operations comply with state and federal water quality standards through proper environmental monitoring</p>	<p>NPDES compliance</p>	<p>Monthly NPDES reports</p>

1.11) Expected size of program.

1.11.1) Proposed annual broodstock collection level (maximum number of adult fish).

The combined egg take goal for the Minter Creek Hatchery is approximately 2.5 million eggs, which includes 2.0 million eggs for the Minter Creek program (1.8 million on-station release), 200,000 for the Gorst Creek yearling program and 80,000 for educational / enhancement co-op projects. In addition, 60,000 unfed fry are shipped to the NMFS

Manchester Lab but are not released. Broodstock requirements for these programs are approximately 1,400 total adults, assuming a 1:1 sex ratio and a 10% prespawning mortality. Also, Coulter Creek is used for temporary rearing of chinook destined for the Tumwater Falls facility on the Deschutes River.

1.11.2) Proposed annual fish release levels (maximum number) by life stage and location.

WDFW shall limit, as the management intent, annual production of fall chinook for on-station release at Minter Creek Hatchery to a total, maximum of 1,800,000 fingerlings or sub-yearlings. Limiting juvenile production to current (proposed) levels will help retain, and not forestall, potential future options for the recovery of the listed chinook ESU.

Life Stage	Release Location	Annual Release Level
Eyed Eggs		
Unfed Fry	Kingman Creek (15.0000)*	10,000
	Sherwood Creek (14.0094)	10,000
Fry		
Fingerling	Minter Creek (15.0048)	1,800,000
	Rosedale Pond (Carr Inlet)	15,000
Yearling		

Note: The NMFS Manchester Lab gets 60,000 unfed fry, but no release takes place.

* - Unfed fry releases are a part of a co-op educational project.

Note 2: Minter Creek, via Coulter Creek Hatchery (not part of egg take goal at Minter), supports the early rearing portion of the Tumwater Falls fingerling chinook program (not part of egg take goal at Minter). 1.8 million at ~150 fish per pound are shipped to Tumwater Falls in April and an additional 1 million are shipped, in two lots, in May. 200,000 fingerlings are shipped to Gorst Creek for the WDFW / Suquamish yearling program (part of the egg take goal at Minter).

1.12) Current program performance, including estimated smolt-to-adult survival rates, adult production levels, and escapement levels. Indicate the source of these data.

There have not been any tagged groups of fingerling fall chinook reared and released from Minter Creek since 79-81 broodyears. Starting with the 1998 releases, 99-100% of the fingerlings were mass marked (adipose-fin clip only).

Broodstock levels back to the hatchery rack for brood years 1995 through 2001 were 1,065, 574, 3,799, 8,492, 10,474, 7,456 and 11,184, respectively.

1.13) Date program started (years in operation), or is expected to start.

Minter Creek in the 1950's.

1.14) Expected duration of program.

Ongoing.

1.15) Watersheds targeted by program.

Minter Creek (15.0048)

1.16) Indicate alternative actions considered for attaining program goals, and reasons why those actions are not being proposed.

None.

SECTION 2. PROGRAM EFFECTS ON ESA-LISTED SALMONID POPULATIONS.

2.1) List all ESA permits or authorizations in hand for the hatchery program.

None.

2.2) Provide descriptions, status, and projected take actions and levels for ESA-listed natural populations in the target area.

2.2.1) Description of ESA-listed salmonid population(s) affected by the program.

- Identify the ESA-listed population(s) that will be directly affected by the program.

None

There are no ESA-listed natural salmonid populations in the program target area. Salo and Bayliff (1958) indicated that there was not an indigenous fall chinook stock in Minter Creek. In this watershed, adult chinook returns and any resulting natural production are dependent upon local hatchery program production. The available habitat is not judged to be typical, productive fall chinook habitat and would not likely support a self-sustaining, naturally spawning fall chinook population. If the local hatchery production program was terminated, it is expected that natural chinook production in this watershed would eventually disappear. These opinions could be tested by identifying all hatchery fall chinook production in this watershed and monitoring natural production /productivity.

- Identify the ESA-listed population(s) that may be incidentally affected by the

program.

South Sound Tributary Summer/Fall Chinook. Stock-specific spawning ground, juvenile life history, survival and productivity data are generally lacking for this natural population. The population is presumed to be similar in biological characteristics to the other south Puget Sound fall chinook populations (Puyallup River and Green River fall chinook), since it is thought to be dependent on on-going hatchery production (strays) in south Puget Sound. SASSI defines this stock as naturally spawning chinook in a number of widely distributed rivers, including McAllister Creek, Grovers Creek, Gorst Creek, Chambers Creek, Carr Inlet tributaries, the Deschutes River and other small streams in south Puget Sound.

White River Spring Chinook. There is a hatchery supplementation program for this stock at the Hupp Springs rearing facility in the Minter Creek watershed. This program is independent of the White River natural population, utilizing on-station returns to the Minter Creek trap for broodstock and releasing 85,000 yearlings and 250,000 fingerlings into Minter Creek each year. Excess production is transferred to the White River.

2.2.2) Status of ESA-listed salmonid population(s) affected by the program.

- Describe the status of the listed natural population(s) relative to “critical” and “viable” population thresholds

Critical and viable population thresholds under ESA have not been determined, however, the SASSI report determined that status of the South Sound Tributary Summer/Fall Chinook stock is "healthy".

- Provide the most recent 12 year (e.g. 1988-present) progeny-to-parent ratios, survival data by life-stage, or other measures of productivity for the listed population. Indicate the source of these data.

Not known

- Provide the most recent 12 year (e.g. 1988-1999) annual spawning abundance estimates, or any other abundance information. Indicate the source of these data.

Estimates of fall chinook spawning naturally in South Sound Tributaries:

<u>Year</u>	<u>Spawning numbers</u>
1988	4257
1989	4979
1990	15814
1991	3681
1992	3610

1993	2998
1994	4950
1995	7456
1996	14931
1997	4192
1998	6372
1999	11028

- Provide the most recent 12 year (e.g. 1988-1999) estimates of annual proportions of direct hatchery-origin and listed natural-origin fish on natural spawning grounds, if known.

South Sound Tributary Summer/Fall Chinook- Unknown. We do not have spawning ground data to estimate the proportion of origin of the spawners in south sound independent tributaries.

2.2.3) Describe hatchery activities, including associated monitoring and evaluation and research programs, that may lead to the take of listed fish in the target area, and provide estimated annual levels of take

- Describe hatchery activities that may lead to the take of listed salmonid populations in the target area, including how, where, and when the takes may occur, the risk potential for their occurrence, and the likely effects of the take.

Release of Minter Creek fall chinook fingerlings coincidentally with the Hupp Springs White River spring chinook fingerlings may contribute to unquantified negative ecological influences on this hatchery recovery program (e.g. competition effects in the freshwater and estuarine areas). This is believed unlikely, though, due to the difference in size between the fingerling fall chinook and the yearling spring chinook.

There is an extremely low likelihood that returning wild chinook shall be incorporated into the broodstock as there is no wild chinook production in Minter Creek.

There is no risk that the hatchery intakes may pose a take risk to wild chinook as there are none in the watershed.

- Provide information regarding past takes associated with the hatchery program, (if known) including numbers taken, and observed injury or mortality levels for listed fish.

NA

-Provide projected annual take levels for listed fish by life stage (juvenile and adult) quantified (to the extent feasible) by the type of take resulting from the hatchery

program (e.g. capture, handling, tagging, injury, or lethal take).

See "take" table at the end of this HGMP

- Indicate contingency plans for addressing situations where take levels within a given year have exceeded, or are projected to exceed, take levels described in this plan for the program.

SECTION 3. RELATIONSHIP OF PROGRAM TO OTHER MANAGEMENT OBJECTIVES

3.1) Describe alignment of the hatchery program with any ESU-wide hatchery plan (e.g. *Hood Canal Summer Chum Conservation Initiative*) or other regionally accepted policies (e.g. the NPPC *Annual Production Review Report and Recommendations* - NPPC document 99-15). Explain any proposed deviations from the plan or policies.

There are no applicable plans or policies.

3.2) List all existing cooperative agreements, memoranda of understanding, memoranda of agreement, or other management plans or court orders under which program operates.

This program operates consistent with the Puget Sound Salmon Management Plan.

3.3) Relationship to harvest objectives.

3.3.1) Describe fisheries benefitting from the program, and indicate harvest levels and rates for program-origin fish for the last twelve years (1988-99), if available.

WDFW and the affected Treaty Tribes have jointly limited Carr Inlet Treaty and non-Treaty chinook fisheries in order to minimize harvest impacts on White River Spring Chinook as they return to Minter Creek, at the expense of precluded Minter Creek Fall Chinook harvest.

There have been no coded-wire-tag groups released to represent this production type under recent fishery management regulations (1978 through 1981 broods were the last tag groups for this program with complete data).

The Fishery Regulation Assessment Model (FRAM) predicts total 2000 fishery exploitation on this stock of 33%, with a total Washington fishery exploitation of 25% (FRAM run #0800, run with final 2000 regulation package). Predicted 2000 exploitation rates, by fisheries, are as follows:

Fishery	Predicted Exploitation Rate
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Alaska	1%
Canada	7%
WA Treaty Troll	1%
WA Non-treaty Troll	1%
PS Treaty Troll	2%
PS Sport	16%
PS Treaty Net	5%
PS Non-treaty Net	0%
Total	33%

3.4) Relationship to habitat protection and recovery strategies.

3.5) Ecological interactions.

Program fall chinook fingerlings may provide prey for yearling and older steelhead and cutthroat and yearling coho in the freshwater and estuarine areas. Program fall chinook fingerlings may compete with Hupp Springs spring chinook fingerlings in the freshwater and estuarine areas. Factors limiting marine production are not clearly understood (e.g. forage species population dynamics and status, fluctuations in environmental physical parameters, marine carrying capacity, etc.), but there are likely unquantified competitive relationships between program fish and natural chinook stocks within the Puget Sound ESU.

Predation risk to listed species is "low" and competition risk is "unknown" (WDFW Risk Assessment 2001).

Increasing pinniped populations in Puget Sound may be negatively affecting survival of this program's production. Additionally, avian predators appear to be keying in on the release of Minter Creek hatchery-origin chinook production.

SECTION 4. WATER SOURCE

4.1) Provide a quantitative and narrative description of the water source (spring, well, surface), water quality profile, and natural limitations to production attributable to the water source.

The water source use for fish rearing at Minter Creek Hatchery is surface water from Minter Creek. Water quality varies greatly with the time of the year and weather. Temperature profiles are monitored. Water quality is improved by the settling of solids from incoming water in the rearing ponds. There is no data on differences in water temperature between the water source and the discharging water of the ponds. The hatchery operates under NPDES permit, number WAG 13-1024. During the summer it is not always possible to meet the goals for settleable solids from the pollution abatement

pond due to the prolific growth of algae in the abatement pond.

At Coulter Creek there are two water sources; 1) a small stream that passes through the adult trap pond and 2) Coulter Creek. Coulter Creek water is pumped into two large, asphalt rearing ponds which discharge into the adult pond.

4.2) Indicate risk aversion measures that will be applied to minimize the likelihood for the take of listed natural fish as a result of hatchery water withdrawal, screening, or effluent discharge.

There are no native, listed fish in Minter Creek or Coulter Creek. Chinook are not passed upstream at Minter Creek. At Minter Creek Hatchery, there are two intake structures; a gravity intake with 1.0" x .094" screens, and a pump intake with 4.0" x .156" wedge-wire screens. Although no wild listed species exist above the intakes, the intake screen structures are scheduled for retrofitting, pending available funding. Pond waste is pumped onto the wooded uplands surrounding the hatchery at Coulter Creek and into a formal abatement system at Minter Creek.

SECTION 5. FACILITIES

5.1) Broodstock collection facilities (or methods)

Broodstock chinook are trapped from July through October at Minter Creek using a concrete step ladder ending in a sorter from which species are separated into any one of 4 holding ponds or returned upstream or back downstream in some cases. All non-target species are released upstream as soon as practical.

5.2) Fish transportation equipment (description of pen, tank truck, or container used).

Fish are typically hauled in a 300 gallon steel tank. If a larger tank is needed it is borrowed from another facility.

5.3) Broodstock holding and spawning facilities.

At Minter Creek Hatchery, broodstock are held until ripe in concrete raceway-style ponds measuring 20' X 120'.

5.4) Incubation facilities.

All incubation is done in vertical-style incubators using either pathogen free well water or Minter Creek water.

5.5) Rearing facilities.

Fish are reared in any one of several different sized concrete raceway ponds, either 10' X 100' or more commonly in 20' X 140'.

5.6) Acclimation/release facilities.

Fish are acclimated on Minter Creek water during the entire rearing period. Fish are reared and released directly from the rearing ponds into Minter Creek

5.7) Describe operational difficulties or disasters that led to significant fish mortality.

There have been no significant fall chinook mortalities, but Minter Creek Hatchery uses a lot of reuse water and there is an increased risk in the spring when the rearing densities are high.

5.8) Indicate available back-up systems, and risk aversion measures that will be applied, that minimize the likelihood for the take of listed natural fish that may result from equipment failure, water loss, flooding, disease transmission, or other events that could lead to injury or mortality.

The hatchery is staffed full time and have modern water alarm systems which are tested weekly.

SECTION 6. BROODSTOCK ORIGIN AND IDENTITY

Describe the origin and identity of broodstock used in the program, its ESA-listing status, annual collection goals, and relationship to wild fish of the same species/population.

6.1) Source.

Broodstock source is adult chinook returning to the Minter Creek Hatchery. WDFW shall continue to use gametes procured from fall chinook salmon adults volunteering to the Minter Creek Hatchery to effect this program. The intent is to collect localized hatchery-origin broodstock at this location.

6.2) Supporting information.

6.2.1) History.

Minter Creek stock originated from Soos Creek (Green River) Hatchery near Auburn. Rivers Inlet stock was introduced into Minter Creek on one occasion in the mid-1970s , for recreational enhancement.

6.2.2) Annual size.

1,400 adults for the core programs. More adults are required if eggs are needed to

support the Tumwater Falls or Grovers Creek fingerling chinook programs.

6.2.3) Past and proposed level of natural fish in broodstock.

Past levels of naturally produced chinook in the broodstock are unknown but have probably been low. Starting with the 1998 brood, Minter Creek chinook have been mass marked with an adipose fin clip. The intent is to use only hatchery-origin fish for broodstock and this will be 100% attainable starting in 2002. As there is no natural production above the hatchery, and tide water below, it is anticipated that there will be few to no "wild" origin chinook trapped at Minter Creek.

6.2.4) Genetic or ecological differences.

None known

6.2.5) Reasons for choosing.

Locally adapted stock..

6.3) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic or ecological effects to listed natural fish that may occur as a result of broodstock selection practices.

SECTION 7. BROODSTOCK COLLECTION

7.1) Life-history stage to be collected (adults, eggs, or juveniles).

Adults.

7.2) Collection or sampling design.

Fall chinook are trapped in August and September and spawned in September and October. They are trapped by use of an instream barrier dam and a step ladder. At Minter, the fish enter a sorter prior to entering the holding ponds.

7.3) Identity.

Currently all fall chinook returning to the hatchery can be used for broodstock.

7.4) Proposed number to be collected:

7.4.1) Program goal (assuming 1:1 sex ratio for adults):

1,400 adult fall chinook are needed for the Minter Creek programs. Depending on needs (shortfalls) of other programs, more broodstock may be needed.

7.4.2) Broodstock collection levels for the last twelve years (e.g. 1988-99), or for most recent years available:

Year	Adults Females	Males	Jacks	Eggs	Juveniles
1988	242	250	3	1,090,000	
	<i>118</i>	<i>186</i>	4	<i>538,000</i>	
1989	406	415	5	1,692,000	
	<i>380</i>	<i>400</i>	8		
1990	972	1685	18	3,665,000	
	<i>297</i>	<i>300</i>	6	<i>1,330,000</i>	
1991	916	925	20	4,126,000	
	<i>701</i>	<i>725</i>	<i>15</i>	<i>3,300,000</i>	
1992	819	900	15	3,715,000	
	<i>none</i>				
1993	370	400	11	1,363,000	
	<i>none</i>				
1994	911	1261	65	3,963,000	
	<i>377</i>	<i>400</i>	<i>10</i>	<i>1,564,000</i>	
1995	312	304	0	1,393,000	
	<i>493</i>	<i>1565</i>	<i>24</i>	<i>1,851,000</i>	
1996	89	77	2	380,000	
	<i>695</i>	<i>700</i>	<i>20</i>	<i>2,794,000</i>	
1997	442	439	3	1,570,000	
	<i>209</i>	<i>207</i>	<i>10</i>	<i>786,000</i>	
1998	1588	1430	25	6,472,000	
	<i>164</i>	<i>100</i>	<i>0</i>	<i>624,000</i>	
1999	704	540	6	2,988,000	
	<i>232</i>	<i>180</i>	<i>0</i>	<i>980,000</i>	
2000	980	908	9	4,660,000	
2001	619	629	8	2,667,700	

NOTE: Upper figures are for Minter Creek Hatchery
Lower figures are for Coulter Creek Hatchery

7.5) Disposition of hatchery-origin fish collected in surplus of broodstock needs.

Fall chinook adults collected at Minter Creek, surplus to egg take needs, are removed from the system. These fish are killed and are either sold to the contracted fish buyer, supplied to food banks or made available for nutrient enhancement projects. A policy of not passing fall chinook upstream of the Minter Creek rack was instituted with the 2000 return. At Coulter Creek (discontinued releases in 2001), hatchery fall chinook will be allowed to spawn naturally for nutrient enrichment and potential enhancement within the basin. The Coulter Creek trap will not be operated unless Minter Creek is unable to collect adults sufficient for the station's programmed egg take need.

7.6) Fish transportation and holding methods.

Adult fall chinook are spawned on site. There is no need to transport or inoculate adults.

7.7) Describe fish health maintenance and sanitation procedures applied.

Fish health measures are consistent with the Co-Manager's Disease Policy (NWIFC and WDFW 1998).

A portion of the returnees are ELISA sampled for Bacterial Kidney Disease antibody titers. Up to 200,000 eyed eggs from "below-low" titer adults are reserved for the Gorst Creek yearling Chinook program, as a means of controlling BKD outbreaks in the yearling program.

7.8) Disposition of carcasses.

Spawned and unspawned carcasses are usually sold on contract. There are a few prespawning mortalities which are buried on station.

7.9) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic or ecological effects to listed natural fish resulting from the broodstock collection program.

The risk of fish disease amplification will be minimized by following the Co-Manager's Disease Policy. No listed fish will be knowingly spawned.

SECTION 8. MATING

Describe fish mating procedures that will be used, including those applied to meet performance indicators identified previously.

8.1) Selection method.

All ripe fish of hatchery origin are spawned until program goals are met. There is no selection for any traits or timing. All selection is random.

8.2) Males.

Males are randomly selected. Jacks used at a 2% rate

8.3) Fertilization.

Sperm is pooled in 5 fish lots and added to the pooled eggs of five females.

8.4) Cryopreserved gametes.

None used.

8.5) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic or ecological effects to listed natural fish resulting from the mating scheme.

NA

SECTION 9. INCUBATION AND REARING -

Specify any management *goals* (e.g. “egg to smolt survival”) that the hatchery is currently operating under for the hatchery stock in the appropriate sections below. Provide data on the success of meeting the desired hatchery goals.

9.1) Incubation:

9.1.1) Number of eggs taken and survival rates to eye-up and/or ponding.

Number of eggs taken by year at Minter Creek are:

Year	Eggs	Survival Rate to Eye Up	Survival Rate to Ponding
1988			
1989			

Year	Eggs	Survival Rate to Eye Up	Survival Rate to Ponding
1990	3,665,000	Unknown	Unknown
1991	4,126,000	Unknown	Unknown
1992	3,715,000	85.0%	Unknown
1993	1,363,000	87.9%	85.0%
1994	3,963,000	93.4%	91.9%
1995	1,393,000	90.3%	88.9%
1996	380,000	92.9%	90%
1997	1,570,000	94.9%	86.3%
1998	6,472,000	95.7%	93.7%
1999	2,988,000	93.6%	90.2%

9.1.2) Cause for, and disposition of surplus egg takes.

Egg takes are currently being managed to minimize the potential for surplus eggs. The current policy is to release excess fall chinook fry into landlocked lakes in order to minimize affects on ESA-listed salmonid populations.

9.1.3) Loading densities applied during incubation.

Egg size varies from 1500 eggs per pound (/lb) to 1150 eggs/lb. Incubator flows are 4 to 4.5 gallons per minute (gpm). The number of eggs per tray is between 6,000 and 8000.

9.1.4) Incubation conditions.

At Minter Creek the silt loads in the incubators are monitored and the incubators are cleaned as needed. Most of our incubation is done with well water which is a constant 49 degrees Fahrenheit. Some surface water is used when needed

9.1.5) Ponding.

Fry are usually force ponded in late December through January based on visual inspection of the fish. It is difficult to monitor accurate temperature units to determine when to pond fry as they are sometimes on creek water and sometimes on well water.

9.1.6) Fish health maintenance and monitoring.

Fungus is controlled with a formalin drip treatment. Egg mortality is removed using a mechanical picker when eggs reach the eyed stage.

9.1.7) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic and ecological effects to listed fish during incubation.

Minter Creek fall chinook and White River spring chinook are incubated in separate, isolated, incubation rooms to minimize the risk of inter-stock disease transmission during this stage of rearing.

9.2) Rearing:

9.2.1) Provide survival rate data (*average program performance*) by hatchery life stage (fry to fingerling; fingerling to smolt) for the most recent twelve years (1988-99), or for years dependable data are available..

For Minter Creek:

Green egg to fry Goal = 90% Range = 85.3 to 94.3% Average = 89.6%

Fry to Smolt Goal = 90% Range = 93.6 to 98.3% Average = 95.7%

9.2.2) Density and loading criteria (goals and actual levels).

Fish are usually released at or below 5 pounds per gallons (lbs/gal.) of flow.

9.2.3) Fish rearing conditions

Weight samples are taken weekly and pond loadings are monitored . Dissolved oxygen readings are taken as needed.

9.2.4) Indicate biweekly or monthly fish growth information (*average program performance*), including length, weight, and condition factor data collected during rearing, if available.

Not available.

9.2.5) Indicate monthly fish growth rate and energy reserve data (*average program performance*), if available.

Not available.

9.2.6) Indicate food type used, daily application schedule, feeding rate range (e.g. % B.W./day and lbs/gpm inflow), and estimates of total food conversion efficiency during rearing (*average program performance*).

Either Bio Moist or Bio Diet is fed 1 to 6 times per day at 2.0% to 2.5% body weight /day. The lbs/gal inflow does not exceed 0.1.

9.2.7) Fish health monitoring, disease treatment, and sanitation procedures.

Fish health is monitored by staff and a fish health specialist. Treatments are prescribed by the fish health specialist. Ponds are cleaned weekly.

9.2.8) Smolt development indices (e.g. gill ATPase activity), if applicable.

NA

9.2.9) Indicate the use of "natural" rearing methods as applied in the program.

NA

9.2.10) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic and ecological effects to listed fish under propagation.

Only fish of known hatchery origin will be spawned in the future. All hatchery chinook have been adipose-fin clipped the last 4 brood years (1997,1998, 1999 and 2000). Fish will be reared to sub-yearling smolt size to mimic typical Puget Sound natural fall chinook fish outmigration strategy and to minimize the risk of domestication effects.

SECTION 10. RELEASE

Describe fish release levels, and release practices applied through the hatchery program.

10.1) Proposed fish release levels.

The Minter Creek fall chinook release goal is 1.8 million fingerling smolts released in May at 80 fpp (2000 Future Brood Document). Samples of fish are weighed and measured prior to release to estimate variation in size. The goal of the rearing program is to attain a coefficient of variation for weight/length of 10.0 or less in order to decrease the

likelihood that the development of some fish will be retarded. Such fish would be more likely to residualize in freshwater and interact with listed wild fish.

Age Class	Maximum Number	Size (fpp)	Release Date	Location
Eggs				
Unfed Fry				
Fry				
Fingerling	1,800,000	80	May	Minter Creek
Yearling				

Data from 1999 Current Brood Document.

Minter Creek, via Coulter Creek, supports the early rearing portion of the Tumwater Falls fingerling Chinook program. 1.8 million at ~150 fish per pound are shipped to Tumwater Falls in April and an additional 1 million are shipped, in two lots, in May. 200,000 fingerlings are shipped to Gorst Creek for the WDFW / Suquamish yearling program.

In addition to the fingerling smolt program, the hatchery transfers eggs to schools and eggs or fed fry to Regional Enhancement Groups (see below) for releases into various streams in South Puget Sound. They are:

15,000 fish	80	May	Rosedale Pond
10,000 unfed fry	1,000	April-May	Kingman Cr. (WRIA 15.0000)
10,000 unfed fry	1,000	April-May	Sherwood Cr. (14.0094)
60,000 unfed fry	n.a.	No Release	Manchester

10.2) Specific location(s) of proposed release(s).

Stream, river, or watercourse:

Release point:

Major watershed:

Basin or Region:

- 1) Minter Creek (15.0048) (RM 0.5), Carr Inlet, Puget Sound
- 2) Tributary to Case Inlet (Kingman Cr.), Puget Sound
- 3) Sherwood Creek (14.0094)
- 4) Rosedale Pond (West of Gig Harbor, near Rosedale)

10.3) Actual numbers and sizes of fish released by age class through the program.

Minter Creek:

Release year	Eggs/ Unfed Fry	Avg size	Fry	Avg size	Fingerling	Avg size	Yearling	Avg size
1988					1,471,000	78		
1989					1,910,700	75		
1990	772,000	1,000			1,877,700	80		
1991					1,968,200	80		
1992					2,007,000	100		
1993					1,096,000	80	35,000	10
1994					1,117,500	80		
1995					2,073,000	80		
1996	227,000	950			1,924,300	80		
1997	414,000	1,000			1,919,800	80	51,500	4
1998					2,069,000	74	77,800	6
1999	25,748	990			2,066,000	73		
2000					1,975,600	74		
2001					1,844,650	75		
Average					1,808,604	79		

Note: Yearling releases are no longer part of the Minter Creek fall chinook program.

10.4) Actual dates of release and description of release protocols.

Table. Release date ranges for Minter Creek releases on station

Year	Life Stage	Start Date	End Date
1995	Fingerling Smolt	May 16	May 24
1996	Unfed Fry	January 18	January 18
	Fingerling Smolt	April 11	April 11
	Fingerling Smolt	May 10	May 10
1997	Unfed Fry	January 27	January 27
	Fingerling Smolt	May 8	May 8
	Yearling	June 3	June 3

NMFS HGMP Template - 12/30/99

1998	Fingerling Smolt	April 30	April 30
	Yearling	May 16	May 16
1999	Unfed Fry	January 20	January 20
	Fingerling Smolt	May 3	May 10

Minter Creek chinook are generally released the first part of May when they exhibit strong migratory behavior and the tides are good for release. They are released in the evening on the start of an incoming tide. They are forced out of the ponds.

10.5) Fish transportation procedures, if applicable.

Fry are transported to Tumwater Falls in fish tankers with recirculating, oxygenated water.

10.6) Acclimation procedures.

All fish are acclimated on creek water from ponding to release.

10.7) Marks applied, and proportions of the total hatchery population marked, to identify hatchery adults.

Table. Proportion of releases of chinook from Minter Creek which are coded-wire tagged and/or adipose-fin clipped.

Minter Creek:

1997	2,069,000 fingerlings	AD Only	99%
1998	2,066,000 fingerlings	AD Only	98.87%
1999	1,975,600 fingerlings	AD Only	99%

WDFW will continue to mass mark (adipose-fin clip only) 100% of the fall chinook salmon fingerlings released through the hatchery program each year to allow monitoring and evaluation of the hatchery program fish releases and adult returns.

WDFW shall apply coded-wire tags to a portion of the sub-yearling fall chinook production at Minter Creek Hatchery to allow for evaluation of fishery contribution, survival rates and straying levels to other Puget Sound watersheds

10.8) Disposition plans for fish identified at the time of release as surplus to programmed or approved levels.

Undetermined at this time. None anticipated.

10.9) Fish health certification procedures applied pre-release.

Each lot of fish is examined by a WDFW Fish Health Specialist prior to release or transfer, in accordance with the Co-Managers Salmonid Disease Policy.

10.10) Emergency release procedures in response to flooding or water system failure.

In the event of a water system failure, screens would be pulled to allow fish to exit the pond. In some cases they can be transferred into other rearing vessels to prevent an emergency release.

10.11) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic and ecological effects to listed fish resulting from fish releases.

Chinook are released from Minter Creek Hatchery as fingerling smolts, generally around the first of May. Releasing zero age smolts should speed migration time to salt water and thus reduce the likelihood of hatchery fish preying on or competing with wild salmonids

SECTION 11. MONITORING AND EVALUATION OF PERFORMANCE INDICATORS

11.1) Monitoring and evaluation of “Performance Indicators” presented in Section 1.10.

Note: See section 1.10 for Monitoring and Evaluation. The purpose of a monitoring program is to identify and evaluate the benefits and risks which may derive from the hatchery program. The monitoring program is designed to answer questions of whether the hatchery is providing the benefits intended, while also minimizing or eliminating the risks inherent in the program. A key tool in any monitoring program is having a mechanism to identify each hatchery production group.

Each production group shall be identified with distinct otolith marks, adipose clips, coded wire tags, blank wire tags or other identification methods as they become available, to allow for evaluation of each particular rearing and/or release strategy. This will allow for selective harvest on hatchery stocks when appropriate, monitoring of interactions of hatchery and wild fish wherever they co-mingle in riverine, estuarine and marine habitats and assessment of the status of the target population. WDFW shall monitor the Chinook salmon escapement into the target and non-target Chinook populations to estimate the

number of tagged, un-tagged and marked fish escaping into the river each year and the stray rates of hatchery Chinook into the rivers.

11.1.1) Describe plans and methods proposed to collect data necessary to respond to each “Performance Indicator” identified for the program.

See 1.10 for Monitoring and Evaluation

With the advent of mass marking, this will allow for identification of all hatchery fall chinook production in the watershed and help monitor NOR/HOR spawning ground ratios in this watershed below the hatchery and in adjacent streams and creeks.

11.1.2) Indicate whether funding, staffing, and other support logistics are available or committed to allow implementation of the monitoring and evaluation program.

Funding and resources are currently committed to monitor and evaluate this program as detailed in the Resource Management Plan for Puget Sound Chinook Salmon Hatcheries (Washington Department of Fish and Wildlife and Puget Sound Treaty Tribes, August 23, 2002).

11.2) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic and ecological effects to listed fish resulting from monitoring and evaluation activities.

Monitoring and evaluation will be undertaken in a manner which does not result in an unauthorized take of listed chinook.

SECTION 12. RESEARCH

12.1) Objective or purpose.

Entities managing fishery resources in the Pacific Northwest are struggling with an intriguing paradox related to the use of fish culture to aid in recovery of depressed populations. Hatcheries are seen as a likely tool contributing to recovery efforts yet domesticated hatchery salmonids typically exhibit low reproductive success in natural habitats and thus likely pose genetic and ecological risks to extant native populations (Leider et al. 1990, Hinder et al. 1991, Fleming et al. 1996, Reisenbichler and Ruben, 1999). A need exists to directly evaluate the effects of domestication on natural reproductive fitness and, perhaps equally important, to determine how quickly renaturalization of hatchery-origin fish might be expected to reduce differences in fitness between hatchery and wild fish over time. To that end, this research proposes to directly

examine these two issues using coho salmon in a natural stream (Minter Creek, a representative salmon-bearing tributary to Puget Sound). Also proposed is to perform some specific experiments in an artificial stream setting in order to gain a better understanding of the biological basis of any observed differences between hatchery and wild-origin fish. Contemporary DNA-based genetic tools are proposed to be used in combination with morphological and behavioral analyses to: 1) measure (and identify causal factors for) differences in natural reproductive competence between wild and hatchery coho salmon, and 2) explore the relationship between reproductive fitness in the natural environment and degree of hatchery ancestry. Tissue samples will be taken from adult coho salmon passed upstream (2000, 2001, 2003) and from their progeny (2001-2005) during the fry and smolt stages. Progeny will be collected by smolt trap (2002-2005) and seining/electrofishing (2001-2004). Limited encounters with listed White River spring chinook juveniles will occur.

12.2) Cooperating and funding agencies.

National Marine Fisheries Service (NMFS)

12.3) Principle investigator or project supervisor and staff.

Howard Fuss, WDFW

Mike Ford, NMFS

12.4) Status of stock, particularly the group affected by project, if different than the stock(s) described in Section 2.

Hatchery reared White River Spring Chinook, an ESA listed stock

12.5) Techniques: include capture methods, drugs, samples collected, tags applied.

Spring Chinook will be captured incidentally to sampling of coho fry by seine or electrofishing. We anticipate no handling of Spring Chinook in smolt trap due to its' location upstream of the hatchery release point.

12.6) Dates or time period in which research activity occurs.

Research will be each year (2001-2004) from March 1 until July 1.

12.7) Care and maintenance of live fish or eggs, holding duration, transport methods.

White River Spring Chinook will be released without further handling. Coho will be held and anesthetized according to standard protocols to assure safe release.

12.8) Expected type and effects of take and potential for injury or mortality.

We expect less than 1% mortality on the fish collected for measurement.

12.9) Level of take of listed fish: number or range of fish handled, injured, or killed by sex, age, or size, if not already indicated in Section 2 and the attached “take table” (Table 1).

We expect to encounter fewer than 50 residual White River Spring Chinook in Minter Creek during seining or electrofishing of coho. Most of our effort will occur above the release point of the hatchery chinook.

12.10) Alternative methods to achieve project objectives.

None. Smolt trapping and coho fry collection is one element of the Minter Creek Coho Genetics Study funded under the Hatchery Scientific Review Group (HSRG).

12.11) List species similar or related to the threatened species; provide number and causes of mortality related to this research project.

We expect to encounter chinook (<50), cutthroat (>50), coho (>500) and chum (<500).

12.12) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse ecological effects, injury, or mortality to listed fish as a result of the proposed research activities.

White River spring chinook captured incidentally will be released immediately. Most of the effort will occur above the release point of the hatchery chinook.

SECTION 13. ATTACHMENTS AND CITATIONS

Piper, Robert, et. al., 1982, Fish Hatchery Management; United States Dept of Interior, Fish and Wildlife Service, Washington, DC.

Washington Department of Fish and Wildlife. 1996. Fish Health Manual. Hatcheries Program, Fish Health Division, Washington Department of Fish and Wildlife, Olympia.

Seidel, Paul, 1983, Spawning Guidelines for Washington Department of Fish and Wildlife Hatcheries, Washington Department of Fish and Wildlife, Olympia.

Washington Department of Fish and Wildlife, Hatchery Operation Plan and Performance Summaries, 1995.

Washington Department of Fish and Wildlife and Puget Sound Treaty Tribes, 2002, “Puget Sound Chinook Salmon Hatcheries, Resource Management Plan”, a component of Comprehensive Chinook Salmon Management Plan, August 23, 2002. 103 pages.

SECTION 14. CERTIFICATION LANGUAGE AND SIGNATURE OF RESPONSIBLE PARTY

“I hereby certify that the foregoing information is complete, true and correct to the best of my knowledge and belief. I understand that the information provided in this HGMP is submitted for the purpose of receiving limits from take prohibitions specified under the Endangered Species Act of 1973 (16 U.S.C.1531-1543) and regulations promulgated thereafter for the proposed hatchery program, and that any false statement may subject me to the criminal penalties of 18 U.S.C. 1001, or penalties provided under the Endangered Species Act of 1973.”

Name, Title, and Signature of Applicant:

Certified by_____ Date:_____

Table 1. Estimated listed salmonid take levels of by hatchery activity.

Listed species affected: Chinook ESU/Population: Puget Sound Chinook Activity: Hatchery Fingerling Production				
Location of hatchery activity: Minter Creek Dates of activity: July to June Hatchery program operator: WDFW				
Type of Take	Annual Take of Listed Fish By Life Stage (<i>Number of Fish</i>)			
	Egg/Fry	Juvenile/Smolt	Adult	Carcass
Observe or harass a)				
Collect for transport b)				
Capture, handle, and release c)				
Capture, handle, tag/mark/tissue sample, and release d)				
Removal (e.g. broodstock) e)			Unknown	
Intentional lethal take f)			Unknown	
Unintentional lethal take g)	Unknown	Unknown	Unknown	
Other Take (specify) h)				

a. Contact with listed fish through stream surveys, carcass and mark recovery projects, or migrational delay at weirs.

b. Take associated with weir or trapping operations where listed fish are captured and transported for release.

c. Take associated with weir or trapping operations where listed fish are captured, handled and released upstream or downstream.

d. Take occurring due to tagging and/or bio-sampling of fish collected through trapping operations prior to upstream or downstream release, or through carcass recovery programs.

e. Listed fish removed from the wild and collected for use as broodstock.

f. Intentional mortality of listed fish, usually as a result of spawning as broodstock.

g. Unintentional mortality of listed fish, including loss of fish during transport or holding prior to spawning or prior to release into the wild, or, for integrated programs, mortalities during incubation and rearing.

h. Other takes not identified above as a category.